

WQB "Wide Aperture Quad" for Main Injector

25 August 2005, 9:00 AM

IB2 conference room

Attendees: Linda Alsip, Weiren Chou, TJ Gardner, Camille Ginsburg, Hank Glass, Dave Harding, Vladimir Kashikhin, Ioanis Kourbanis, Bill Robotham, John Zweibohmer

Measurements

Hank showed the body/end separation at 1000 A on WQB001. He finds the body field to be 5.721 T/m at 1000 A. Comparing that to the full-length measurement, the effective length of the magnet is 2.154 m. Dividing the y intercept of the GL(z) curve by the slope, we find the effective length of the end to be 18 mm. Hank is still working on understanding the harmonics in the end field.

WQB002, with the larger but uncooled crossover bus, was run up to 3000 A briefly for a thermal check. At 3000 A the bus stabilized at 80 C. That is probably OK for magnetic measurements, but not OK for use in the tunnel. The single wire stretched wire system is set up and will be used to measure the field at 2800 A. That should give us a good start on refining the field shape, if necessary.

WQB001-1 was shipped to MTF this morning, having been retrofitted with a water-cooled crossover bus. It will be installed on test stand C, where it can be powered to 4000 A. After the SSW measurement on WQB002, or even concurrently, the next order of business will be the full-current, full-length excitation curve on WQB001.

On both WQB001 and WQB002 the measured inductance of the main coils is close to that predicted by Vladimir's calculation. The trim coil inductance should be $(18/7)^2$ of the main coil, but is roughly half the expected number. Leon Bartelson and George Krafczyk have confirmed the values measured by TD. This is not understood. [Note added in proof: The ratio of trim to main coil inductances in the Main Injector quads was fairly close to the expected number of $(14/4)^2$.] A magnetic measurement becomes high priority.

Design

A new water cooled crossover bus was designed, produced and installed on WQB001, which shipped to MTF this morning. We will proceed with this design for the rest of the magnets. A thermal calculation has confirmed that the water cooling is sufficient to handle the heat generated in the tubes and joints of the rest of the bus/manifold.

Procurement

Some parts for the water cooled bus were borrowed from other magnets. Additional purchases will be made to ensure adequate quantities for the balance of production. Procurement of additional pole shims has begun.

As of this morning, many of the BPM components are already fabricated. They have sent some parts out to another vendor who specializes in wire EDM machining. They admitted they are going to have a hard time keeping the delivery schedule but would not give us an updated delivery date until they get the parts back from that other vendor. They assured us they will do what they can to deliver the first unit as soon as possible. In the first week of August, they predicted delivery of one unit on 8/29, so they are not late yet.

Fabrication

WQB001 is at MTF.

WQB002 is at MTF, but will returned to IB#2 for the improved bus..

WQB003 is being manifolded.

WQB004 has two quarter core with coil assemblies complete and two more coils being impregnated.

WQB005 has four coils wound; cores and trim coils are 50% complete.

WQB006 has two main coils wound.

Schedule

The schedule has been revised to depict the return of WQB001 to MTF for a 20 day cycle of end iterations and the required rework of 002's bus. The schedule now depicts the completion of four magnets by Oct 17, 2005 and seven magnets by Nov 7, 2005.

Next meeting will be 1 September 2005 at 9:00 in the Industrial Building 2 conference room.